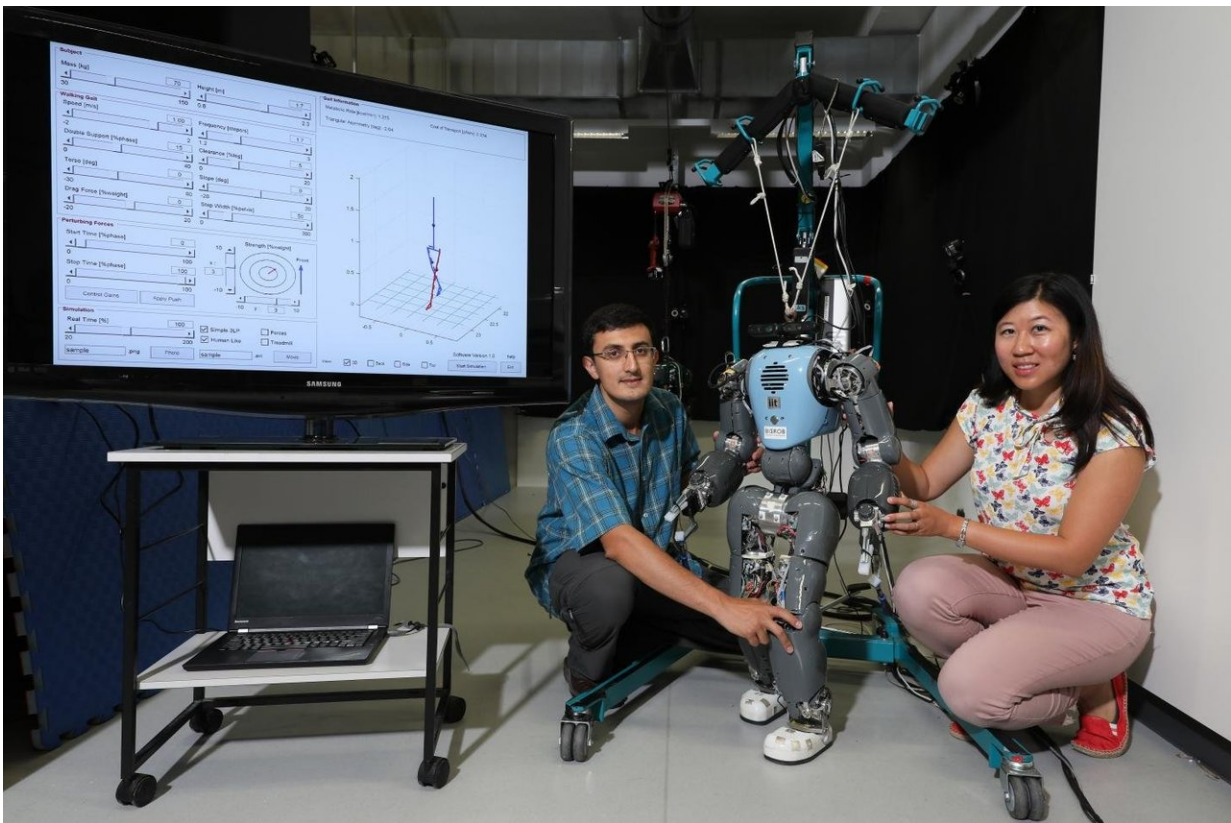


An avatar uses your gait to predict how many calories you will burn

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An avatar uses your gait to predict how many calories you will burn. Credit: Alain Herzog / EPFL 2018

Humans instinctively adopt the gait that requires the least amount of energy given the walking conditions. Without realizing it, we are

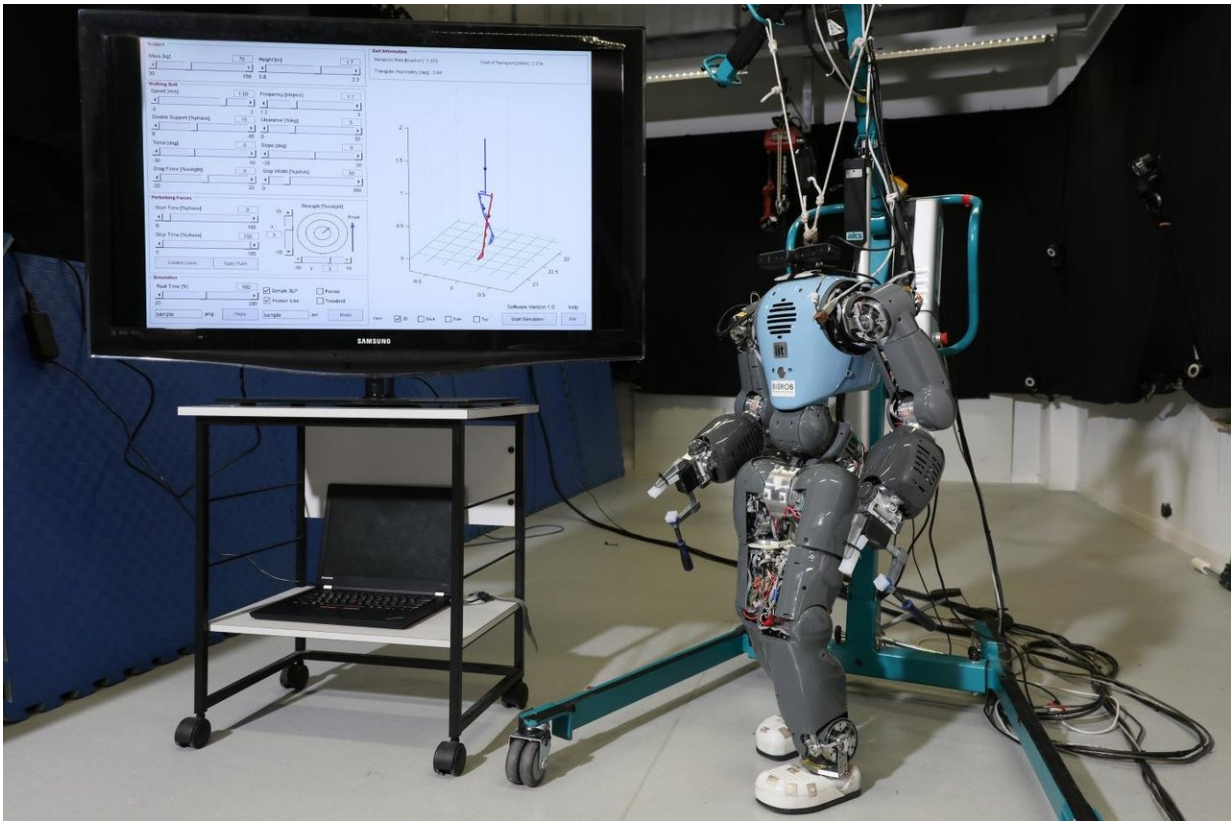
constantly tweaking our pace, stride length and foot lift. But could we consciously play with these parameters in order to influence our energy expenditure?

Researchers at EPFL's Biorobotics Laboratory studied eight gait parameters to develop a sophisticated [software](#) program that uses an avatar to predict how much energy people use when they walk depending on their walking style. This research has been published in *Scientific Reports*. Salman Faraji, the co-lead author, devoted an entire section of his thesis to this topic.

The avatar, a torso equipped with two legs and feet, can be freely configured. Users enter their height and weight and can then set the walking speed, distance between their feet (stride length and stride width), and foot lift, along with the incline of both the torso and the ground. They can also add mass and simulate the effect of being pushed or pulled at different parts of the body. The number of calories burned and the energy consumption are displayed in real time whenever the parameters are modified.

Making custom exoskeletons

This pioneering software drew on a number of experiments appearing in recent literature, and it offers a huge number of potential applications—especially in the medical realm. "The software could be used to select the best design for an exoskeleton or a custom prosthetic in order to reduce the user's effort. With a wearable exoskeleton, for example, we could optimize the location of the battery and actuators, or determine the ideal walking pattern for the user's preferred speed," says co-author Amy Wu. The software could even determine where a backpack should be worn in order to minimize [energy expenditure](#). "If, on the other hand, your goal is to burn calories, the software could be used to find a series of movements with a high metabolic cost."



New avatar-based software developed at EPFL looks at how people walk in order to predict their energy expenditure. Credit: Alain Herzog/ EPFL 2018

The software was created in a robotics lab and was initially intended to study the mechanics of human gait for use in [humanoid robots](#). "The way humans walk is extremely complex. The level of control required is a huge challenge for humanoid robots, which often don't get it quite right," says Faraji. "We have a long way to go before we really understand all the parameters that go into human, animal and robot locomotion."

More information: Salman Faraji et al. A simple model of mechanical effects to estimate metabolic cost of human walking, *Scientific Reports*

(2018). [DOI: 10.1038/s41598-018-29429-z](https://doi.org/10.1038/s41598-018-29429-z)

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